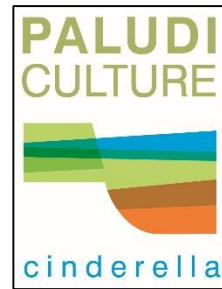


CINDERELLA - Update XIV

August 2017, W. Wichtmann

“Comparative analysis, integration and exemplary implementation of climate smart land use practices on organic soils: progressing paludicultures after centuries of peatland destruction and neglect”



By irregular updates the CINDERELLA community and colleagues are informed about dates, news and other interesting issues within the scope of the CINDERELLA project, ref. paludiculture. All partners are kindly asked to provide current information, which can be inserted here. The idea is to keep all project partners informed on the same level, to exchange information, to ask project related current questions, to arrange meetings and to make appointments as well as to prepare common activities (publications, new projects, etc.).

Planned workshop on Peatland Policy (EU-Stakeholder-Workshop) in Brussels December, 6th 2017

As promised to the FACCE JPI organization during our workshop in Brussels in spring, the Cinderella project together with the CAOS project (<https://www.thuenen.de/en/ak/projects/caos/>) are preparing an EU-Stakeholder-Workshop in Brussels. It will be held in the representation of the federal state of Lower Saxony at EU (Vertretung des Landes Niedersachsen bei der Europäischen Union), Rue Montoyer 61, B-1000 Bruxelles.

We intend to raise awareness of policy makers and discuss options how European policies related to the management of organic soils should be amended in order to contribute to climate change mitigation targets. The workshop is directed at decision makers and has the following objectives:

- 1) Presentation of preliminary project results (FACCE-ERA-Net projects CAOS, CINDERELLA) for a more sustainable use of organic soils
- 2) Discussion how bottlenecks on the European scale regarding legal issues and support policies can be overcome
- 3) Bring peatlands into the climate discussion and pave the way towards accounting for GHG emissions reduction by rewetting and paludiculture

The workshop intends to invite representatives from politics, administration of EU and member states (EU parliament, EU-Commission, DG Clima, DG Agri, DG Env., ...), delegates from Science and associations and NGOs. The program will include some introduction on the `peatland and climate` issue, short presentations on the CINDERELLA project (paludiculture management, utilization of biomass, economic aspects) and the CAOS project (socio-economy, proposals for alternative peatland management), accomplished by some input from project partners of both projects (experiences with *Typha* production in Netherlands, experiences with subsurface irrigation). Further presentations will deal with peatlands within the European agricultural, climate and nature protection politics. The workshop hopefully will give answers to open questions in European policy for peatlands mentioned above.

We would like you to give proposals for issues to be discussed as well as for potential participants of this workshop, especially representatives and stakeholders from your countries, please provide appropriate information to: Wendelin.Wichtmann@uni-greifswald.de.

News from other projects and peatland related activities

WETSCAPES - Above- and belowground production and decomposition in temperate wetlands

The joint research project WETSCAPES co-operates with several research groups of the Universities Rostock and Greifswald on understanding turnover and exchange of matter in wetlands to foster better land management, climate adaptation and protection of water bodies. The objective of the large-scale WETSCAPES project is to develop scientific foundations for a sustainable management of degraded and then re-wetted wetlands. Within WETSCAPES, the production and decomposition of above- and belowground biomass in temperate wetlands is quantified, with a special focus on root processes. These are key factors in the overall assessment of the carbon budget, because primary production of plants determines the amount of carbon input into these wetlands. Particularly important for the formation or degradation of peat, the most important carbon store, is the growth and turnover of root biomass. However, these factors are understudied in the wetland types in question. The project is funded by the Program for Excellence in Research Mecklenburg-West Pomerania for a duration of 4 years (2017 to 2020). Contact: Gesche Blume-Werry, Jürgen Kreyling, <https://botanik.uni-greifswald.de/en/experimental-plant-ecology/projects/wetscapes/>

Clean Ryck initiative (Initiative "Sauberer Ryck")

The river Ryck is a lowland river in Western Pomerania which is about 30 km long. The river passes the city of Greifswald and in the village Wieck it flows into the Greifswald lagoon (Greifswalder Bodden). Around Greifswald the Ryck and its shore lines are used as recreation area and for different leisure activities (Fig. 2). The agricultural use in the catchment area of the Ryck comprises agriculture (61%) and meadowland (13%). Other 10% are forested. Large parts of the catchment area are drained, the adjacent peatlands are often diked. Several pumping stations drain the waters downstream, contributing to high nutrient loads to the river. These nutrients derive from diffuse sources, e.g. agricultural runoffs and drainage waters (N) and point sources like wastewater treatment plants (P). During summer often oxygen deficiency in the river leads to high fish mortality. As, after the European Water Framework Directive, the classification of the ecological status of the Ryck is "not good", bathing is not recommended.

In summer 2016 the "clean Ryck initiative" was initiated which takes the Ryck and its water quality into the focus. The initiative organized a symposium which was held in December 2016 with about 80 participants to exchange information on the status of the Ryck and to find solutions for the improvement of the rivers water quality. There was a wide interest at authorities, farmers, associations (soil and water board, NGOs), scientists and interested citizens. As a result, two working groups, „practical measures“ and "public relations" became established. As first results, peatland rewetting in the catchment area and their reestablishment as wetland buffer zones was identified as a practical measure which will be tackled in the next years, wherever possible. The CLEARANCE project decided to use the Ryck catchment as a study area for modeling possibilities to improve water quality by the installation of wetland buffer zones and paludiculture. For awareness raising, the public relations group organizes a Ryck-River-Day which will be held the 14th of October 2017, with different activities

like a river jump (following the international Big Jump Challenge at the European River Swimming Day), photo competition, boat trips, plantation of trees etc.



Figures 1 and 2: The river Ryck. (l) the Ryck flows like a channel west from Greifswald (photo: Michael Succow), (r) near the mouth of the river Ryck (photo: René Fronczek).

Baseline and Monitoring Methodology for Rewetting Drained Peatlands approved by VCS

John Couwenberg (couw@gmx.net)

On 17th of July, the Verified Carbon Standard (VCS), the largest carbon standard on the voluntary market, approved and published a methodology for rewetting of drained temperate peatlands. The methodology is named 'VM0036 – Methodology for Rewetting Drained Temperate Peatlands'. A methodology is a technical document used by project developers to quantify the greenhouse gas benefits of their project. It also sets out requirements to determine project boundaries, set baselines and assess additionality. Criteria are included to determine whether a particular project is eligible to apply the methodology.

Projects registering with VCS can use approved VCS methodologies, any methodology approved under the United Nations Clean Development Mechanism (CDM), and methodologies developed by the Climate Action Reserve (CAR) with the exception of their forest protocols. The methodology VM0036 outlines procedures to estimate the reduction of net greenhouse gas emissions resulting from project activities implemented to rewet drained peatlands in temperate climatic regions. It allows for the estimation of GHG emissions from drained and rewetted peatlands and also accounts for changes in carbon stocks in selected non-peat carbon pools.

The scope of the methodology is essentially limited to project activities that aim at the rewetting of peatlands that have been drained for forestry, peat extraction or agriculture, but where these activities are not or no longer profitable. Post-rewetting land use is limited to forestry, agriculture, nature conservation/recreation, or activities limited to those aiming at GHG emission reductions, or a combination of these activities. The methodology uses ground vegetation composition and water table depth as proxies for peatland GHG emissions, known as the 'GEST' approach (GEST: Greenhouse gas Emission Site Type).

A VCS spokesperson expressed excitement to have the methodology approved under the VCS Program: 'It covers a project activity which we believe is quite underrepresented and has the potential to generate significant emission reductions and removals. We also appreciate the creative and flexible approach taken by the methodology, specifically the use of ground vegetation composition and water

table depth as proxies for peatland GHG emissions.’ The methodology has been developed for (but is not limited to) use in the Belarus Peatland Rewetting Project (“BPR Project”). It was authored by Silvestrum Climate Associates, The Netherlands and Greifswald University, Germany. Its development was funded by the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU), Germany, and supported by BirdLife Belarus (APB), Centre for International Migration (CIM), Germany, and the Royal Society for the Protection of Birds (RSPB), United Kingdom.

The methodology is the first to address emissions from temperate peatlands. Earlier methodologies were released that address tropical peatlands (VM0007, VM0027). VM0027 was explicitly developed to validate the REDD+ demonstration activity of WWF Germany taking place in the Sebangau National Park, located in Indonesia - Central Kalimantan. Whereas VM0027 is rather restrictive in the methods and proxies used to derive greenhouse gas fluxes, VM0007 is much more flexible. It provides a set of modules that can be put together to arrive at a fully functional methodology. Since 2015, VM0007 includes modules that address emissions from peat decomposition as well as fire. It is currently being applied in the Katingan Peatland Restoration and Conservation Project.

VM0036: <http://database.v-c-s.org/methodologies/methodology-rewetting-drained-temperate-peatlands>

Sebangau project: <http://ifri.snre.umich.edu/redd/view/project.php?id=515>

Katingan project: <http://www.katinganproject.com>

The project ReedBase: examples for reed utilization from the Danube delta

(Andreas Haberl, Wendelin Wichtmann)

The Advisory Assistance Programme (AAP) from the German Federal Agency for Environment funds the project ReedBASE. This project focusses on the management of degraded reedbeds along the rivers Pruth, Dniester and Danube in Moldova and Ukraine. Functioning as a cross-border innovation hub, ReedBASE will bring stakeholders from administration, entrepreneurship and research together for the development of future projects into the context of sustainable management and utilisation of reedbeds and wetlands. ReedBASE will in such install a centre for innovation as a basis for the assessment and exploitation of reed biomass produced sustainably under site adapted conditions, identifies area and implementation-potential for revitalisation of degraded areas by reed cultivation within the project region. After the project implementation period, the established ReedBASE innovation cluster will develop further suitable concepts for reed harvesting on wetland sites and the utilisation of the biomass supporting business innovation and startups.

In June representatives from the lead partner Michael Succow Foundation (GMC) together with their local partners from Ukraine (IMPEER, Agricola, AEI), Moldova (ACTIE), and Romania (WWF DCPO, DDNIRD), held several stakeholder meetings and field trips to interesting sites for the project, some selected examples are given in the following:

Ukraine, Reni, Bio Top reed pellets production Fieldfare

In Reni (UA), Paul Goriup is working on the installation and optimization of the processing of pellets from reed-biomass since several years. His investment volume so far is 300,000 €. The small company is based on the approach to scale the harvesting and processing facilities customised for the size of the area under management.

The harvesting area for reed (giant reed) biomass is in the direct vicinity of the processing facilities (<1km), in total ~300 ha are used for provision of the pellet line. Another 100 ha could be added if

necessary close by. The harvesting equipment in use is a Seiga machine and a small sized caterpillar harvester, both for harvesting bundles. During winter season the reeds are harvested, bundles are brought to a barn for storage and processing to pellets. Some part of the biomass is stored outside. The facility is designed to operate the whole year. In a separate hall, the big-packs with the pellets are stored.



Figure 3: Bio Top reed pellets production facilities near Reni.

Once properly adjusted, the pelleting process runs fully automatic after feeding in the biomass to the chipping unit. Adjustment at the beginning of each batch is a sensitive and the most time-consuming step and needs careful manual judgement and adjustment (moisture, pressure, processing speed) by the operator. Operational performance is balanced at the moment to 150 – 170 kg/h. Maximal performance is 300 – 400 kg/h due to limits of the power supply to the facilities but also due to optimisation of a continuous workflow throughout the year (Fig. 3).

Vilkovo Enterprise UKRRID briquetting of waste reed & thatch marketing

The UKRRID company in Vilkovo (UA) produces thatch for export to the European Union. After harvest, raw reed bundles are stored open-air in large piles and are manually processed to thatch bundles. Approximately 70% of the total production from last season already had been shipped to northwestern Europe (mid of June 2017). Another 30% still have to be processed to marketable thatch. The disposal of annually arising waste reed from combing out and cutting the raw bundles is a costly factor therefore a briquetting line has been established to produce fuel briquettes for sale to the local and regional market (Fig. 4 - 7).

The waste reed is in a first step processed to small cubic bales that are stored in the machine hall of the briquetting line. There the bales are fed into a small disintegration unit and chipper. After being chopped down to a small fraction ~3 - 8 mm in a hammer mill, the biomass fed into the press block for briquetting. The potential performance is ~300 – 400 kg/hr.



Figures 4 and 5: (l): raw bundles are piled in open-air stacks, in the front, a work bench for manual processing of the raw bundles surrounded by waste reed. (r): bundles, ready for shipping abroad, are piled up for final drying at the open air.



Figures 6 and 7: (l): two Seiga machines waiting for their restoration before next winter harvesting service, (r) pile of marketable reed bundles.



Figures 8 and 9: (l): small reed bales stored for further processing to briquettes, (r): briquetting line with a disintegration unit, hammer mill, and pressblock.

Costs for the briquetting facility were about 50,000 Euro, the performance is 45 KW. The line is not producing since two years, as the power supply is too weak to facilitate a continuous production, despite the fact that a new transformer had been recently installed on grounds of the facility. Moisture content in the small fraction before pressing cannot be adjusted. Efficient dust filters are missing (Fig. 8 and 9). UKRRID has two Seiga machines and trailers for the reed harvest that have been produced in Odessa where also spare parts (tyres) are produced (Fig. 6). In Vilково UKRRID has a further facility for

storage and packing of the thatch bundles for export in big batches of 50 or 100 bundles each. A larger Enterprise from Odessa owns UKRRID (Fig. 10 and 11).



Figures 10 and 11: (l) processed thatch bundles are transported to the storage and packing facilities of UKRRID in Vilkovo; (r): Stored big batches of thatch reed for export.

Mayaky “Dnestroviez” reed processing facility (briquettes, construction mats, roof thatch)

Thatch material is also produced from reedbeds in the Dniester basin (Fig. 19). Most of the thatch material is exported mainly to Netherlands, Denmark and Germany. Per year approximately 600 – 800 tons of reed are produced by the Dnestroviez company, which is accompanied with simultaneous production of about 700 t DM of waste material. Harvesting of reed in form of raw bundles is realized using two Seiga machines. The wheels for these machines are imported from Denmark. During good weather conditions the performance is about 10 ha per day. Harvesting takes place in large reedbeds within two main fields in the Dniester National Park area, each of them in ca. 15 km distance to the place where further processing is done. About 1,000 ha the Dniester national park and 800 ha on private real estates are available for harvesting, but not fully harvested every year. Some stronger reed (diameter of culms can be more than for reed used as thatch) is used for manual plates production (2 * 1 m, ~5cm thick). One worker can produce 15 – 20 plates per day (~90m²). Before political change, this company produced about 30,000 of such plates per season. Currently production numbers for local markets are ~500 mats/year (Fig. 12 and 13).



Figures 12 and 13: (l): Manual construction plates production; (r): The CEO Andrey Bulavin of Dnestroviez company during explanations.

Briquettes are produced from waste reed to provide greenhouses with fuel for heating, 10 kg are sold for ~2€. The potential performance of the briquettes production equipment is 300 kg per hour, the average productivity is only 70 kg per hour. Currently the briquetting line is not working due to lack of profitability. Two types of briquettes can be produced: one type is cylindrical with a diameter of ~6cm and a length of ~30cm, the other one is a cuboid 6*6*30cm with a cylindrical central hole, diameter ~2cm. The latter one is more compacted and preprocessed with heat thus having higher energy content (Fig. 14 – 16).



Figures 14, 15, 16: (l & m): Briquetting line for cylindrical reed briquettes of company Dniestroviez; (r): The second type of reed briquette produced by Dniestroviez.

Mayaky LLC “Ecodnestr” reed processing facility (roof thatch, privacy shield mats)

The company runs at least eight Seiga machines on about 3,000 ha properties at three different sites available for harvesting. Some of these areas are situated on an island in the mouth of the Dniester River. The raw bundles are manufactured to marketable bundles. Either 50 or 100 of these bundles are packed to a large bale for export. Transport is done by lorries/trailers to northwestern Europe. Also weaving of mats is realized in this company on halve automatic looms in total they have 12 of these looms. In the facility visited are two looms installed made in Austria (Maschinenfabrik Ludwig Berger in Knittelfeld, Austria) At present such looms are not produced any longer at the company but where developed and produced there in the 1950s to the 1980s largely for export (Fig. 17 an 18).



Figures 17 and 18: (l) R. Wanner explaining the focus of LLC “Ecodnestr” on production of reed thatch and mats for export; (r): Halve automatic loom for reed mats.

The CEO Raimund Wanner, who studied in Germany and is partly residing in Munich/Augsburg, is in direct contact with companies in Germany who are in need for thatch and other construction businesses. These companies are organised under an umbrella limited company (IHB mbH) in Munich. (http://www.listofcompaniesin.com/Wanner_Water_Reed_Co_Ltd_Company_1463827.html)



Figure 19: (I): Mouth of the River Dniestr near Mayaky with adjacent large reedbeds

The new Paludarium in the Botanical Garden of Greifswald University (W. Wichtmann, Susanne Abel)

Greifswald University can look back on a long tradition in research on the cultivation of wetland plants. More than 150 years ago, the founder of the botanical garden and museum at Greifswald University, Julius Münter, published an article about *Zizania aquatica* and mentioned its potential cultivation on the “lower meadows”. Since 1994 - 14 research projects have been conducted by the GMC and its partners about paludiculture on fens or bogs.

In preparation of the rrr2017 conference, on Sunday, the 23rd of July, the exhibition on paludiculture plants was opened at the Botanical Garden of Greifswald University. For this the already existing `Paludarium` (exhibition of wetland plants) has been updated and extended by plant containers with additional several important paludiculture plants. More than 50 people were interested and followed the introduction to the exhibition, given by Susanne Abel from GMC. She prepared this exhibition during the last month with help of some colleagues. The exhibition of paludiculture plants was funded by the NUE-foundation. Three categories of plants are shown:

- I. plants that can be used in paludiculture, where already positive experiences have been made
- II. plants, which may play a role for paludiculture, but where some factors still have to be researched (effect on greenhouse gas emissions, peat conservation) = potential paludiculture plants
- III. useful wetland plants, the cultivation of which in peatlands is not peat conserving (e.g. annual rotation necessary, belowground plant parts are used or constant high water tables are not tolerated)

Serving as an introduction to the exhibition, a large information board (Fig. 20) gives information on the concept of paludiculture and the history of research on paludiculture in Greifswald. In total the

exhibition shows more than 40 plants which are described on individual boards with an illustration of the plant and information on its habitus, biology and use.



Figures 20 and 21: (l) Susanne Abel explaining the basics of paludiculture to the interested audience. (r) The open air exhibition in front of the old glasshouses.



Figure 22: Paludiculture plants at exhibition: *Glyceria maxima* (left), *Phragmites australis*, *Phalaris arundinacea* and *Typha angustifolia* (right). In the background: *Miscanthus sinensis* (not usable for paludiculture).

Current state of the upcoming: 2nd reed conference (rrr2017) in Greifswald

The preparation of the rrr2017 conference in Greifswald which will be held in September, is in its final stage now. Newest information can be found on the conference web page: paludiculture.uni-greifswald.de/en/projekte/rrr2017/index.php. Until now 86 people registered for the national conference, 109 persons subscribed for one of the six excursions and ~150 persons registered for the international conference. If not already done, please register as soon as possible that the organisers get an overview and can optimize further preparation of the conference.

New Fellows at Greifswald Mire Centre

Elena Leonovich

Elena Leonovich is a new fellow at the Michael Succow Foundation in the peatland working group. She graduated from the Faculty of Mining and Environmental Engineering of the Belarusian National University of the Republic of Belarus in 2015. She is working as a junior researcher for the Institute of Nature Management of the National Academy of Sciences of Belarus in the biogeochemistry and agroecology laboratory. The purpose of investigation at the Michael Succow Foundation within the Marion Dönhoff program is studying of estimating the balance of greenhouse gases from peatlands.



Nadzeya Liashchynskaya

Nadzeya Liashchynskaya studied biology at Belarusian State University, before starting working at the BMU/KfW Climate & Biodiversity Project in 2009 as a vegetation & monitoring specialist. During her work at the Project she developed a deep professional interest in peatland ecology. Having eight years of experience in the area of peatland restoration and conservation Nadzeya has become a Marion Dönhoff Fellow and will be working on finalisation of a Monitoring report for rewetted peatland sites (years after rewetting) in Belarus under preparation for accrediting carbon credits following the VCS/CCBA Methodology (see information above). The report will be published within the VCS/CCBA program and will be available online under <http://www.v-c-s.org/>. Furthermore, Nadzeya will support the finalisation of the first VCS/CCBA Project Document (PD) in Belarus.



IMCG bulletin June 2017

The latest bulletin by IMCG recently has been published. Again it provides several information on project related relevant issues and gives an overview on recently published papers on peatland protection: <http://www.imcg.net/>. Here you also find a current overview on newest publications on peatland related stuff.

Mires and Peat

Take a look at the latest volume (Vol. 20) of Mires and Peat: <http://mires-and-peat.net> dealing with “Growing Sphagnum”, now 5 articles are online. Use this online magazine to publish your newest results!

New publications

Tho, B.T., Lambertini, C., Eller, F., Brix, H. & Sorell, B.K. (2017): Ammonium and nitrate are both suitable inorganic nitrogen forms for the highly productive wetland grass *Arundo donax*, a candidate species for wetland paludiculture. *Ecological Engineering* 105: 379–386

Jespersen, E., Brix, H. & Sorell, B.K. (2017): Acclimation to light and avoidance of photoinhibition in *Typha latifolia* is associated with high photosynthetic capacity and xanthophyll pigment content. *Functional Plant Biology* 44: 774 – 784